dates no further back than the middle of the 17th century. It is professedly copied from previous writings. The essential parts run thus:

"Melt lead down in an iron kettle, skim it, and when 'tis so hot that it begins to turn greenish, strew as much fine powdered auripigmentum (arsenic) upon it as will lie upon a shilling, to every twelve or fifteen pound of lead, which then must be stirred well, and the auripigmentum will flame. A little may be taken out in a ladle for an essay, and which, when reduced to a proper heat, may be dropt into a glass of water. If the drops prove round, and without tails, there is auripigmentum enough therein, and the temper of the heat is as it should be; but if otherwise, more auripigmentum must be added, and the heat augmented till it be found right."

Directions then follow, to pour the metal through a perforated dish in the usual way, and to sort the shot by means of sieves.

The most remarkable part of the direction is the short space the metal fell through. The perforated dish was "placed on two bars, or other iron frame, over a tub of water, about *four inches* from the water." No wonder "the greatest care was to keep the lead at so moderate a heat, that it be not too cool, to stop the holes, nor too hot, which will make the drops crack and fly;—for the cooler it is, the larger the shot will be. Such as will have very large shot, make the lead trickle with a stick, out of the ladle into the water, without a [perforated] plate."

It would be difficult to point out, in the records of the arts, an example of dullness in old workmen, so gross as the history of hail-shot exposes. For about 240 years previous to Watts' improvement, its fabricators dropped it close to the vessel of water prepared to receive it, while every ounce they made, was attended with embarrassments that loudly suggested a greater fall. Had they melted the metal on a second floor, and poured it from the window, an amount of trouble and mortification would have been avoided, which no one, not practically acquainted with its manufacture, can appreciate. I know not how to account for the fact, unless by supposing no manufactory of any consequence was established, to supply the public, and that sportsmen were in the habit of making it for themselves.

That buck or cast shot sometimes went by the name of hail-shot appears evident. In 1594, some English sea rovers, under James Lancaster, took Pernambuco. The writer of the expedition, in Hakluyt, says their muskets were provided with "haile-shot, which severely gauged the Indians and Portuguese." That this was not dropped shot, appears from his next sentence. "And this is to be noted, that there was both the horse and his rider slaine with one of these shot."

E.

Translated for the Journal of the Franklin Institute.

New Metallurgic Treatment of the Ores of Copper. By MM. RIVOT and PHILLIPS.

This process, by means of which the authors have already treated more than 600 lbs. of copper ore, is principally applied to the sulphur-

etted ores. The ore is first roasted, to reduce it, in great part, to the oxide of copper; then melted with silicious materials, to transform it into a silicate; and it is from the melted silicate that the copper is precipitated, by placing in it bars of iron.

When the reverberatory furnace, in which the authors operate, is very hot, they charge it with a mixture of the roasted ore, with lime or sand, and the slag from a former operation, in sufficient quantity to cause the fusion of the mass; they add charcoal, or poor bituminous coal of small size, in proportion to the quantity of the ore treated.—After the charge, one or two shovels-full of small coal is thrown upon the surface, to preserve it from oxidation from the furnace flame. It is also stirred from time to time, so as to permit it to be heated more uniformly, and melted quicker. The authors have succeeded in melting it completely, in four hours. As soon as the matter begins to thicken, the parts which adhere to the stirrer contain a certain quantity of grains of copper. When the fusion is complete, the tools plunged into the bath, shew that the copper is collected at the lower part of the hearth, near the discharge hole.

When the whole is perfectly fused, six bars of iron, weighing together from 70 to 90 pounds, are placed in it, the ends slipping in grooves opposite to the working door, taking care to plunge them entirely in the bath. Some fresh small coal is thrown upon the surface of the cinder, to prevent the peroxidation of the protoxide of iron of the cinder by the flames; then every two hours it is stirred with two-pronged rakes. A powerful method of stirring also consists in the use of a wooden pole, which, plunged into the cinder, gives a considerable disengagement of gas, and produces strong ebullition.

The authors have found, that, in three or four hours, the action of the bars will reduce the content of the cinder to 0.004 to 0.006. After that time the bars are withdrawn, and the metal drawn off.

The entire duration of an operation is, therefore, eight hours, and three operations per day may easily be made.

The loss of weight by the bars, varied, in the experiments of the authors, from 2 to 12 lbs., for quantities of copper from 24 to 44 lbs., obtained from ores of different richness.—*Bull. Soc. Enc. Indus. Nat.*, May, 1847, p. 248.

Death of Berzelius.

We last week recorded the death of the celebrated Swedish chemist, Berzelius, in the 69th year of his age. He had been for a long time in declining health,—and, although his death will not have taken Europe by surprise, there will be but one feeling of grief for so great a loss. In a century which has produced a greater number of distinguished chemists than, perhaps, of any other class of men of science, Berzelius stood out as a star of the first magnitude. If, perhaps, our younger students of chemistry have, in some measure, lost sight of him, amidst the brilliant researches of modern organic chemists, it must not be forgotten that the patient labors, and sagacious investigations,